Montrose, Colorado, 21st.
Wabash, Indiana, 24th.
Guttenberg, Iowa, 10th, 11th, 22d.
Mountainville, New York, 1st, 23d.
Wauseon, Ohio, 2d, 10th.
Pittsburg, Pennsylvania, 3d.
El Paso, Texas, 9th 12th.
Rio Grande City, Texas, 6th, 25th.
Wytheville, Virginia, 10th, 23d, 26th.
Dale Enterprise, Virginia, 10th, 29th.
Bainbridge Island, Washington Territory, 3d.
Fort Canby, Washington Territory, 7th, 8th.
Prairie du Chien, Wisconsin, 26th.

SAND STORMS.

Fort Thomas, Arizona, 21st.
Wickenburg, Arizona, 4th.
Maricopa, Arizona, 24th.
Keeler, California, 10th.
Santa Fé, New Mexico, 5th.

WATER-SPOUTS.

The ship "Union," H. Fokken, commanding, on June 4th, in N. 41° 18′, W. 59° 31′, saw a large water-spout.

The observer at Key West, Florida, reports that at 12.50 p. m. on the 12th a large but imperfectly-formed water-spout was observed about four miles to the north-northwest of that station. It moved rapidly in a southwesterly direction for ten minutes and then broke. A second and smaller water-spout then appeared in the north-northwest; it followed the course of the one first observed for two or three minutes and then broke.

The s. s. "Grip Fast," Captain Burgess, on June 20th, in N. 36° 9′, W. 71° 33′, saw two water-spouts, one about two miles to the northwest of the vessel and the other about three miles to the southward.

ERRATUM.

In the REVIEW for February, 1885, page 46, under "cautionary signals," in the second line, the number of cautionary signals justified, should read one hundred and fifty instead of one hundred and forty-four; the percentage, 93.75, as published, is correct.

NOTES AND EXTRACTS.

The following extract is from the June, 1885, report of the "Alabama Weather Service," under direction of Prof. P. H. Mell, jr., Auburn:

The month of June has been moderately cool for the season. The thermometer at Calera registered as low as 59°, on the 29th, and 65°, at Mountain View, on the 18th and 30th. This cool wave retarded the growth of the cotton plant to a limited degree, but the injury was slight, and from all quarters of the state good reports are given concerning the crop outlook.

The precipitation was below the normal, but the rainfall was quite evenly distributed throughout the month, and vegetation has not suffered from the lack of moisture. Heavy dews were quite frequent, and the deficiency in rainfall was thus counterbalanced.

Summary.

Mean temperature, 78°.5; highest temperature, 109°, at Livingston, on the 6th; lowest temperature, 54°, at Gadsden, on the 1st; range of temperature, 55°; greatest monthly range of temperature, 42°, at Livingston; least monthly range of temperature, 20°, at La Fayette; mean daily range, 16°.3; greatest daily range of temperature, 44°, at Calera, on the 3d; least daily range of temperature, 2°, at Livingston, on the 26th, and Union Springs, on the 9th.

Mean depth of rainfall, 3.88 inches; mean daily rainfall, 0.126 inch; greatest depth of monthly rainfall, 8.00 inches, at Mount View; least depth of monthly rainfall, 1.23 inches, at Selma; greatest daily rainfall, average for state, 0.48 of an inch, on the 12th; Greatest daily local rainfall, 4.90 inches, at Mount View, on the 12th; days of general rainfall, 8th, 9th, 12th, 16th, 25th; average number of days on which rain fell, 9; average number of cloudy days, 10.3; average number of fair days, 13.9; average number of clear days, 5.8; warmest days, 5th, 6th, 15th; coldest day, 30th.

Prevailing direction of wind, southwest.

Mobile reports that the greatest velocity of wind was 32 miles per hour, from the northeast; Chattanooga, 22 miles, from the northwest; Montgomery, 23 miles, from the northwest; Tuscaloosa, 20 miles, from the southeast.

Thunder-storms were general on the 9th, 13th, 19th, 22d, 24th, 27th, 28th.

The following is an extract from the June, 1885, report of the "Minnesota Weather Service," under direction of Prof. W. W. Payne, of Carleton College, Northfield:

The temperature for June in Minnesota has averaged slightly below the mean; the difference amounting to —0°.3, at Duluth, —2°.0, at Moorhead, —0°.5, at Saint Paul and —°.8, at LaCrosse. Three well-marked cool terms occurred. The first of these cool waves began on the 7th, when there was a sudden and great fall in temperature at all stations, amounting in most cases to from 30° to 50°. On the morning of the 8th and 9th frosts occurred throughout the state, in some sections to the injury of vegetation, while in others not sufficiently heavy to do any harm. At Park Rapids a minimum temperature of 27°.9 was noted on the 8th, cutting down all tender vegetation, which subsequently recovered. At Saint Paul the temperature fell to 36°.0, the lowest, by 3°.0, for June on record. Cool weather prevailed on the 15th and 16th, and the 20th and 21st. The warmest days were the 1st, 11th, 12th, 13th, 14th, 19th, 20th, 26th and 27th. The maximum temperatures of the month were generally observed on the 18th, 19th and 20th; the lowest minimum being 84.1°, on the 18th, at Saint Vincent and highest 94°.0, on the 20th, at Sherburne, Martin county.

The rainfall for June was in excess of the normal at some stations, while others report a marked deficiency. One station, Milbank, reports less than 2 inches (1.56), and three, Mankato, Park Rapids and Moorhead, over 7 inches, 7.40, 7.50 and 7.92, respectively. The region of greatest rainfall was in the northwestern portion of the state, in the vicinity of Park Rapids, Moorhead, Barnesville and Fergus Falls and the central eastern part of the state, at Waseca and Mankato. The greatest deficiency was, as in May, in the central western portion: Bird Island, 2.03, and Milbank, 1.56 inches. Days of greatest rainfall were the 2d, 3d, 6th, 11th, 12th, 13th, 14th, 18th, 19th, 20th and 25th; rains of one inch and over: Moorhead, 1.26, on the 11th, and 2.60, on the 14th; Saint Paul, 1.17 on the 15th; Duluth, 1.90 on the 12th; Redwing, 2.45, on the 13th; Park Rapids, 11th, 1.41; 12th, 1.60; 13th, 1.00, and 19th, 1.35; La Crosse, 13th, 1.03; Mankato, 2d, 4.50 and 13th, 1.27; Albert Lea, 12th, 1.63; Dodge Centre, 2d, 1.30.

Thunder and hail storms were frequent and destructive during the month. On the 2d, 3d, 6th and 7th great damage was caused in the southern part of the state by hail. At Spring Valley much damage was done to crops and buildings by the severe hail and wind storm of the 7th, which had many of the features of a tornado.

The following is an extract from the June, 1885, bulletin of the "New England Meteorological Society," under direction of Prof. Winslow Upton, Providence, R. I.:

The following discussion of the meteorological conditions for the month is based upon reports from one hundred and thirteen observers, and upon the current publications of the United States Signal Service:

General conditions.—The month was characterized by fair weather, with temperatures a little below the average. It was also a dry month, and in some sections the lack of rain began to have an appreciable effect on vegetation. The abundant rains of the closing days of the month which occurred in some localities, though not in all, somewhat relieved the drought. Numerous thunder-storms and a few high winds were reported.

Precipitation.—A comparison with the records of former years shows a striking irregularity in the distribution of the rain. This irregularity is due to the differences in the distribution of the rain in the storms of the 5th and 29th–30th, for, while rain was general in both of these storms, there was great discordance in the amounts which fell even at places in the same locality, especially in the latter storm. Thus, at Fitchburg, Massachusetts, the amount reported was 0.22 inch., and at Petersham 0.25 inch., but at Lawrence and Lowell, Massachusetts, the amounts were 1.77 and 2.24 inches, respectively, while New Bedford received 3.28, and Cotuit 3.55 inches. In New Hampshire and Vermont similar peculiarities were noted; thus, in New Hampshire: Hanover, 0.56, and Concord, 2.77 inches; in Vermont, Dorset, 0.50, and Lunenburgh, 2.03 inches. In Maine the amounts were all large, and in some cases an enormous excess is reported, as Eastport, 2.35, Sebago Lake, 2.97, Gardiner, 3.82 inches. Newspaper reports give the extraordinary amount of 7.50 inches at Augusta, and our observer at Mayfield reports 8.00 inches. There can be no question but that the distribution in this storm was of unusual irregularity, and that very excessive amounts fell in certain localities. The reports show a wide divergence in the comparison of the records with those of past years, which is due to the above cause. The amount of rain at Mount Washington is large, but has been exceeded in several years, the greatest amount for June, 18.46 inches, having been noted in 1872. Snow fell on three days at Mount Washington; on the 24th, Mount Lafayette, New Hampshire, was covered with snow, and on the 9th a slight amount fell at Saint John, New Brunswick. Hail was noted at Albany, New York, on the 9th.

Temperature.—The temperature record presents no unusual characteristics. The monthly average is somewhat below that of former years, with but few exceptions. No unusually high temperatures were noted, though at many stations the temperature was above 90° on one or two days. Cool weather was frequent in the early days of the month, and light frosts were numerous on the 6th, 9th, and 10th. No serious damage to crops was reported.

Pressure.—The fluctuation of the pressure was about as usual, but the monthly average is low, especially in Maine. Five depressions moved near, or over, the district, two passing directly over Massachusetts. All of these approached from the lake region, moving easterly. Their dates were 1st, 5th,

8th, 22d, 29th–30th; of these, the second and fifth were those which passed centrally over the district, the others moving down the Saint Lawrence valley. It will be noticed that the irregular distribution of rain commented on above was in connection with these two storms. The fourth depression presents the anomaly of a depression of considerable depth (the pressure at Montreal on the morning of the 22d having been but 29.36 inches), but was attended by but little precipitation. With the exception of Mount Washington, at which 1.62 inches fell, but little rain was noted at any station.

The following summary for June, 1885, is compiled from the advance report of the "Ohio Meteorological Bureau," under direction of Prof. T. C. Mendenhall:

Atmospheric pressure.—Mean barometer (determined from observations at nineteen stations), 30.01 inches; station reporting highest monthly mean, Wapakoneta, 30.15 inches; station reporting lowest monthly mean, Portsmouth, 29.82 inches; station reporting highest observed reading, Marietta, 30.30 inches, on the 19th; station reporting lowest observed reading, Hiram, 29.45 inches, on the 5th; station reporting greatest monthly range, Cleveland, 0.68 inch; station reporting least monthly range, Ironton, 0.52 inch.

Temperature.—Mean for the state (determined from observations at twenty-eight stations), 67°.2; station reporting highest monthly mean, Pomeroy, 73°.3; station reporting lowest monthly mean, Jefferson, 62°.6; station reporting maximum temperature, Sandusky, 96° on the 7th; station reporting minimum temperature, Junction, 36°, on the 23d; monthly range of temperature for the state 60°; station reporting largest monthly range, Oberlin, 53°.5; station reporting least monthly range, Cincinnati, 31°.8.

Precipitation.—Average for the state (determined from observations at twenty-six stations), 4.41 inches; station reporting largest monthly amount, Hiram, 7.66 inches; station reporting least monthly amount, Junction, 1.52 inches.

The following is an extract from the "Illinois Weather Review" for June, 1885, prepared under direction of Mr. C. F. Mills:

The mean temperature of June, 1885, as indicated by the reports of observers residing in all sections of the state, was higher than the average temperature of June at six stations, and lower at sixteen stations; eleven new stations are not included.

The mean temperature of June the past five years has been as follows, viz.: 1881, 70°.53; 1882, 71°.12; 1883, 69°.40; 1884, 71°.08; 1885, 71°.03.

The highest temperature noted in June for a term of years has been as follows: 1881, 99°.00; 1882, 98°.00; 1883, 95°.00; 1884, 98°.00; 1885, 96°.00; and the lowest temperature for the same month has been as follows: 1881, 39°.00; 1882, 39°.00; 1883, 40°.00; 1884, 45°.00; 1885, 36°.00.

The highest temperature reported in June, 1885, was 96°.00 on the 3d, at Centralia. The lowest, 36°.00, on the 9th, at Wilton Centre, Will county. The highest temperature during the month at a majority of the stations was on the 7th and 26th; the lowest on the 8th and 9th.

The most marked changes in the temperature of the northern division of the state during the month was on the 8th of June, when the lowest daily mean of 50°.00 was recorded for the northern stations. The mean temperature the previous day was 75°.00, making a change of 25°.00 in twenty-four hours. There was another marked change in the temperature in the northern division on the 21st, when the daily mean was 8°.00 below that of the preceding day. On the following day (22d) there was another fall in the temperature of 8°.00, making the reduction 16°.00 in two days.

The precipitation for June, 1885, exceeds the June average for a term of years as noted at the following stations: At Marengo, McHenry county, the June, 1885, precipitation was 1.69 inches more than the average rainfall for a term of years; Chicago, 0.95 inch; Aurora, Kane county, 1.47 inches; Peoria, Peoria county, 0.02 inch; Mattoon, Coles county, 1.38 inches; Pana, Christian county, 5.12 inches; Bunker Hill, Macoupin county, 2.13 inches; Collinsville, Madison county, 1.94 inches; Saint Louis, Missouri, 2.69 inches; Anna, Union county, 0.72 inch; Golconda, Pope county, 3.08 inches; Cairo, Alexander county, 0.10 inch.

The rainfall for June is less than the average for the month at the following stations: At Sycamore, DeKalb county, the June, 1885, precipitation was 0.30 inch less than the average precipitation for June; Prairieville, Lee county, 0.41 inch less; Davenport, Iowa, 2.80 inches; Keokuk, Iowa, 1.38 inches; Springfield, Sangamon county, 2.31 inches; Griggsville, Pike county, 1.98 inches; Palestine, Crawford county, 0.81 inch; Greenville, Bond county, 1.54 inches; McLeansboro, 0.96 inch; Sanwick, Perry county, 0.31 inch.

Frosts are reported to have occurred during the month of June at the stations named, on the following dates: Champaign county, Philo, 9th; Christian county, Pana, 9th; Coles county, Mattoon, 9th; Douglas county, Hugo, 8th; Iroquois county, Watseka, 9th; Knox county, Onedia, 9th; McHenry county, Marengo, 9th; Piatt county, Atwood, 9th; Will county, Wilton Centre, 9th.

The following is the June bulletin of the "Iowa Weather Service," under direction of Dr. Gustavus Hinrichs, Iowa City:

June, 1885, was nearly normal, with excess of rainfall during the first half.

The mean temperature of the air was only half a degree below normal, the first decade being about one and a half degrees above, the last decade three degrees below, normal.

The first half of the month was very rainy, and the amount of rainfall largely in excess of normal, thus hindering the working of the corn fields. During the last half of the month fine and bright days were numerous, but the temperature was rather low.

The principal storms occurred during the first, warm and rainy, half of the month. The thunder squall of the 7th, in southern and eastern Iowa, was followed by remarkably cold weather, a slight but harmless frost being noted on the morning of the 9th in northwestern Iowa. The thunder-storm of the 12th was quite extended throughout the state, with considerable rainfall. But the most noted storm of the month was the squall which, from late Sunday evening until about three o'clock Monday morning, June 15th, came down from the northwest to about the line of the Rock Island road, without doing much damage to fairly good structures, except in Ida and Cerro Gordo counties, where it was preceded by minor tornadoes, the very narrow track of which were marked by the usual destructive effects for the short distances in which the tornadoes reached down to the earth.

The extended storm was truly a squall, which well constructed buildings ought to resist with but slight injury, and against the effects of which properly planted trees will greatly protect, by retarding the motion of the air in the lower stratum in which our dwellings stand. The tornadoes which occurred in two points of the state were very insignificant indeed.

During the latter half of the month, the generally prevailing very fine weather was interrupted by two very moderate squalls on Saturday the 27th.

The following meteorological summary and accompanying remarks are from the June, 1885, report of the "Indiana Weather Service," under direction of Prof. H. A. Huston, of Purdue University, Lafayette:

Districts.	Temperature.			Precipitation.
	Highest.	Lowest.	Monthly mean.	
	°	°	°	
Northern counties	94	36	68.33	4.90
Central counties	90.1	36	68.45	5.09
Southern counties	94	50	71.27	3.40
State	94	36	69.35	4.46

The mean temperature of the state for June, 69°.35, is 2°.74 below that for June of last year, 3°.26 below the mean of fourteen years at Indianapolis, 0°.58 below the mean of nine years at Wabash, 1.35 above the mean of twenty-six years at Logansport, 1°.15 below the mean of thirty-one years at Spiceland, 4°.75 below the mean of twenty-one years at Vevay, 2°.08 below the mean of four years at Blue Lick, 4°.32 below the mean of four years at Worthington, 0°.36 below the mean of six years at this station, and about 3° below the normal.

The mean precipitation for the state, 4.46 inches, is 1.10 inches above that of last year; 0.87 below the mean of fourteen years at Indianapolis; 0.18 below the mean of nine years at Wabash; 0.65 above the mean of twenty-six years at Logansport; 0.18 above the mean of thirty-one years at Spiceland; 0.41 below the mean of twenty-one years at Vevay; 0.16 above the mean of four years at Worthington; and 1.71 below the mean of six years at this station.

The barometer is above the normal for June.

The frost of the 9th did some damage to growing plants in the northern counties.

The thunder-storm of the 27th was very severe at this station. The wind reached a velocity of forty-five miles per hour at 4 p. m.

The following meteorological summary and accompanying remarks are from the June, 1885, report of the "Indiana Volunteer Weather Service," under direction of Prof. W. H. Ragan, of De Pauw University, Greencastle:

Districts.	Temperature.			Precipitation.
	Highest	Lowest.	Monthly mean.	
	°	°	°	
Northern counties	94	36	68.5	4.48
Central counties	92	36	68.1	5.09
Southern counties	97	46	71.8	3.79
State	97	36	69.5	4.75

The temperature averaged a little low, being 0°.5 below the average of nine years at Wabash; 2°.7 below twenty-nine years, Logansport; 1°.6 below thirty-one years, Spiceland; 3°.7 below fifteen years, Indianapolis; 1°.8 below five years, Mauzy; 2°.0 below twenty-one years, Vevay. The average for the state was 0°.7 lower than in 1883, and 2°.9 lower than in 1884. The highest occurred, at most stations, on the 7th, in connection with a low barometer central, that morning, north of the lakes, and a high central off the south Atlantic coast, and the lowest on the 9th in connection with a high central in Iowa and a low in the Gulf of Saint Lawrence.

The temperature averaged 6°.6 lower at our most northerly than at the most southerly station.

The precipitation was 1.23 inches above the average of nine years at Wabash; 1.32 above at Logansport; 0.64 below at Spiceland; 0.27 above at Indianapolis; 1.01 below at Vevay, and the average for the state 0.61 lower than 1883, and 1.05 higher than 1884. The rainfall was unevenly distributed through the month and over the state.

Blank page retained for pagination